## REMARKS

I. Status of the Claims

Claims 1 and 3-31 are pending. Applicants cancel claims 16-17 and amend claims 5, 9, and 12-15 in this response. Assuming entry of the amendment, claims 1, 3-15, and 18-31 will remain for consideration.

II. Claim Amendments

Claims 16-17 are canceled to simplify remaining issues. Other claims are amended in accord with the Examiner's helpful suggestions. In particular, claim 5 is amended to include proper Markush language, and claims 9 and 12-15 are amended to eliminate "and/or" language in favor of "or." The Examiner should enter the amendment because the changes are made at his request to comply with Section 112.

III. Response to the Section 103 Rejection based on Derleth

Applicants traverse the rejection of claims 1, 3, 7-9, 12, 16-19, and 25 under 35 U.S.C. § 103(a) as unpatentable over Derleth et al. (U.S. Pat. No. 5,716,898), and they respectfully ask the Examiner to reconsider and withdraw the rejection in view of the following remarks.

Derleth teaches a way to make silica supports for chromium catalysts useful for ethylene polymerization. The supports are "microspheroidal powders of low dispersity." The powders are produced by: (a) forming a hydrogel; (b) grinding the hydrogel either in the presence of water or before combining it with water (see col. 2., ll. 44-45); (c) forming a suspension of the ground hydrogel and water; (d) atomizing the suspension by spray drying; (e) contacting the spray-dried particles with an organic liquid that assists in drying; and (f) drying the particles to remove traces of moisture and organic liquid.

Among the steps described by Derleth, the grinding step is most relevant to Applicants' claimed process and is worth a closer look. Derleth teaches that

grinding is advantageously "controlled so as to obtain particles with a diameter of less than 50 μm, for example of between 5 and 40 μm, values of between 10 and 30 μm being preferred" (col. 2., ll. 47-50). Consistent with these teachings, Derleth later describes (see Example 1 at col 6,. ll. 46-49) a catalyst support preparation in which a hydrogel is formed, aged, and "treated in a colloid mill . . . A ground hydrogel in the form of 10 to 30 μm particles was collected from the mill and about 10% of water was added to this ground hydrogel."

In contrast, Applicants' claim 1 requires that the "finely particulate hydrogel," (i.e., the milled hydrogel from step b) comprise:

- at least 5% by volume of the particles, based on the total volume of the particles, have a particle size in the range from > 0 μm to ≤ 3 μm; and
- at least 40% by volume of the particles, based on the total volume of the particles, have a particle size in the range from > 0 μm to ≤ 12 μm, and
- at least 75% by volume of the particles, based on the total volume of the particles, have a particle size in the range from > 0 μm to ≤ 35 μm.

The requirement of claim 1 to have *at least 5 vol.% of particles having a particle size ≤ 3 μm* is not fairly taught or suggested by Derleth, which teaches hydrogels having a 10-30 μm range as most preferred. Moreover, claim 1 also requires *at least 40 vol.% of particles having a particle size ≤ 12 μm*, and *at least 75 vol.% of particles having a particle size ≤ 35 μm*. Of the three requirements, Derleth at best appears to disclose only the third one.

In contrast, see Applicant's Table I (application, p. 39), which shows five separate batches of milled hydrogels ("finely particulate hydrogels") produced by following steps (a) and (b) of the claimed process. For each batch, all three claim requirements are met. Batch 1, for instance, gave a milled hydrogel in which 10 vol.% of the hydrogel had a particle size less than 1.86 μm (meeting the at least 5 vol.% ≤ 3 μm limitation of claim 1). In the same batch, 50 vol.% of the hydrogel had a particle size less than 5.46 μm (meeting the at least 40 vol.% ≤ 12 μm limit), and 90 vol.% of the hydrogel had a particle size less than 13.63 μm (meeting the at least 75 vol.% ≤ 35 μm limit).

The Examiner now acknowledges that the claimed process for making a supported catalyst is new, but he maintains that the process would have been obvious from Derleth. In particular, the Examiner asserts that, with regard to the hydrogel particle sizes, it would have been obvious to select the "overlapping portion" of the range disclosed by the reference because "overlapping ranges have been held to be a prima facie case of obviousness" (Office action, p. 3). Further, (Office action, p. 4), "it would have been obvious . . . to have desired hydrogel particle sizes through controlled milling because differences in sizes do not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature [sic; read as 'particle size distribution'] is critical."

Applicants respectfully disagree that Derleth's disclosure is specific enough to make Applicants' claimed process prima facie obvious. Moreover, Applicants have provided experimental evidence sufficient to overcome any such prima facie case.

The Examiner invites us to select the "overlapping portion" of the ranges actually taught by Derleth to arrive somehow at the particularly claimed ranges required by Applicants' claim 1. Such a selection, however, is not possible without application of considerable hindsight and the benefit of Applicants' disclosure. What motivates the skilled person to pick just the portion of Darleth that "overlaps" the requirement of at least 5 vol.% of particles having a particle size ≤ 3 μm? A similar question can be asked related to Applicants' requirement of at least 40 vol.% of particles having a particle size ≤ 12 μm. Because Derleth's disclosure lacks specificity regarding the claimed particle size distribution, it is insufficient to support a prima facie case of obviousness.

Applicants provided considerable experimental evidence that milling the hydrogel to provide a particle size distribution within the claimed range provides unexpected and valuable advantages for olefin polymerization catalysis. Applicants respectfully invite the Examiner to reconsider the results shown on pages 39-44 of the application. Five separate batches of hydrogels were milled to provide finely particulate hydrogels having the claimed particle size distribution

(Table I, p. 39). Slurries of these hydrogels were spray dried, then used to support chromium compounds. The catalysts were activated and used to polymerize ethylene. As Table II (p. 41) shows, Applicants surprisingly found that catalysts of the invention, when compared with catalysts supported on ES 70X, a commercially available spray-dried support, provide a much lower proportion of "fines," i.e., polyethylene particles having a size < 125 μm (0.51-1.3 wt.% versus 6.4 wt.%) and < 250 μm (3-8 wt.% versus 20 wt.%). This could hardly have been "obvious" from Derleth.

Applicants' polymerizations using a supported metallocene (pp. 41-42) provide further evidence of patentability. As Table III (p. 43) shows, a single metallocene complex supported on three different commercially available silicas failed to provide productivities comparable to catalysts made from the same complex and supports made by Applicants' claimed process. Anyway, Derleth fails to predict the outcome of any experiment with metallocene catalysts because Derleth describes only Cr catalysts.

Applicants provided additional evidence of patentability in showing that metallocene catalysts made according to the invention, when used in a gas-phase polymerization of ethylene, produce a smaller amount of fine particles in the discharge from a circulating gas cyclone ("CGC fines") and fewer large lumps when compared with a commercial counterpart (see Table IV, p. 44). Again, Derleth, whose disclosure is limited to Phillips (Cr) catalysts, fails to make these advantages of Applicants' invention apparent.

In sum, Derleth's disclosure is not specific enough to support a prima facie case of obviousness for Applicants' claimed process for preparing a supported catalyst. Additionally, even if it met this test, Applicants provided ample experimental evidence in the application as originally filed to rebut any such prima facie showing. The evidence demonstrates that catalysts that employ Applicants' supports outperform commercial alternatives in olefin polymerizations and provide benefits that could not have been predicted from Derleth and related teachings. The Examiner should therefore reconsider and withdraw the Section 103 rejection.

IV. Response to the Section 103 Rejections based on Derleth in Combination with Other References

Claim 1 is independent and, as explained in Section III, is patentably distinct from Derleth alone. Because all of the additional remaining claims (3-15, and 18-31) refer back to and incorporate the limitations of claim 1, these claims must also be patentable over Derleth alone. The issue is whether any of the additional references cited, in combination with Derleth, make claim 1 obvious.

However, the Examiner relies on the remaining reference teachings (Warthen, Hlatky, Mihan, Brant) for disclosure of particular elements recited in the *dependent* claims, not claim 1. None of the other cited references, when combined with Derleth, contains a disclosure of particle size distributions of finely particulate hydrogels that is specific enough to remedy Derleth's deficiencies in this area. Warthen, for instance, (Ex. 1, col. 5) talks about a milled hydrogel having an average particle size of "about 6.5μ." The combined teachings of Derleth and Warthen are thus insufficient to render Applicants' claim 1 (or any dependent claim) obvious. Moreover, none of Applicants' experimental findings could have been apparent from Warthen or its combination with Derleth.

A similar argument applies to each of Hlatky, Mihan, and Brant, except that these references are even less relevant to the principal issue. Hlatky's focus is metallocene complexes and borate activators, not finely particulate hydrogels useful as supports. Mihan emphasizes MgO or ZnO antistatic agents for a gas-phase olefin polymerization. Brant also deals with metallocene-catalyzed gas-phase processes for olefin polymerization and does not discuss preparation of finely particulate hydrogels useful as catalyst supports. Upon reconsideration, the Examiner should agree that none of the reference combinations fairly teaches or suggests Applicants' claimed process for making supported catalysts based on finely particulate hydrogels having the specific particle size distribution requirements of claim 1.

V. Conclusion

In view of the remarks above, Applicants respectfully ask the Examiner to reconsider and withdraw the Section 103 rejections and pass the case to issue. Applicants invite the Examiner to telephone their attorney at (610) 359-2276 if he believes that a discussion of the application might be helpful.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first-class mail, with sufficient postage, in an envelope addressed to: Commissioner for Patents, P.O. Box. 1450, Alexandria, VA 22313-1450 on July 9, 2009

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